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(56) Documents Cited

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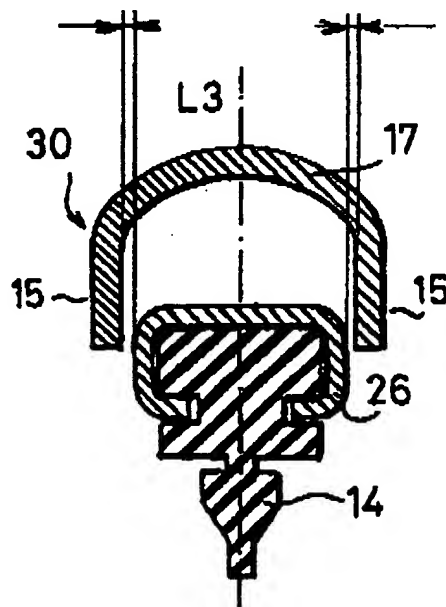
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(54) Curved windscreen wiper

(57) A windscreen wiper for a motor vehicle comprises an articulated structure having an inverted U shape main yoke, primary spreaders, secondary spreaders and hooking claws (26). The articulated structure is arranged so as to curve the blade (14) in a plane substantially parallel to the overall plane of the windscreen. The main yoke may also have a section curved in the same plane as the blade (see figure 2). The median longitudinal axis (L3) of at least one of the claws arranged opposite the main yoke is substantially merged with the median longitudinal axis of the main yoke so that the claw is able to be received between two flanges (15) of the main yoke when the articulated structure is deformed. This arrangement may further be applied to all claws liable to interfere with the main yoke or a secondary spreader.

**FIG.5****GB 2 308 542 A**

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FIG.1

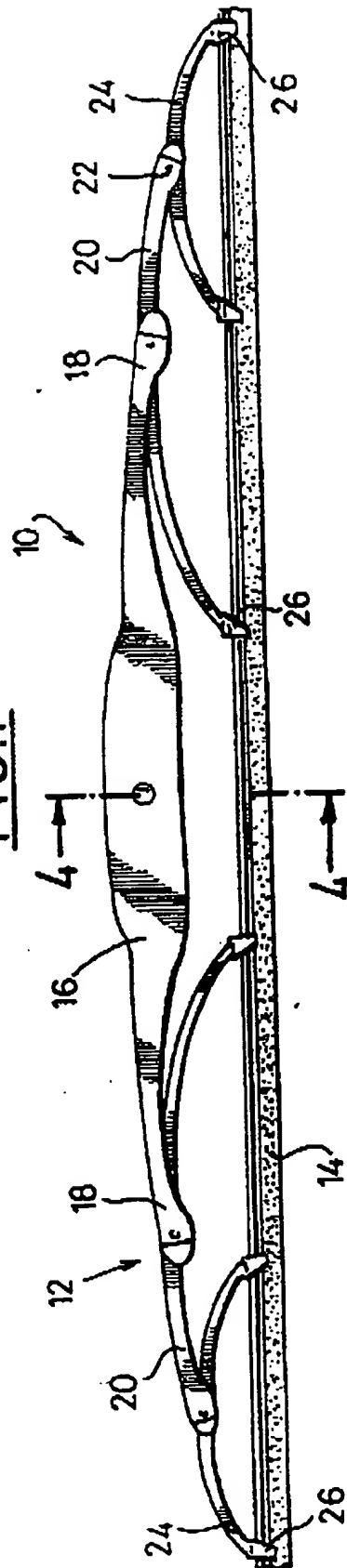
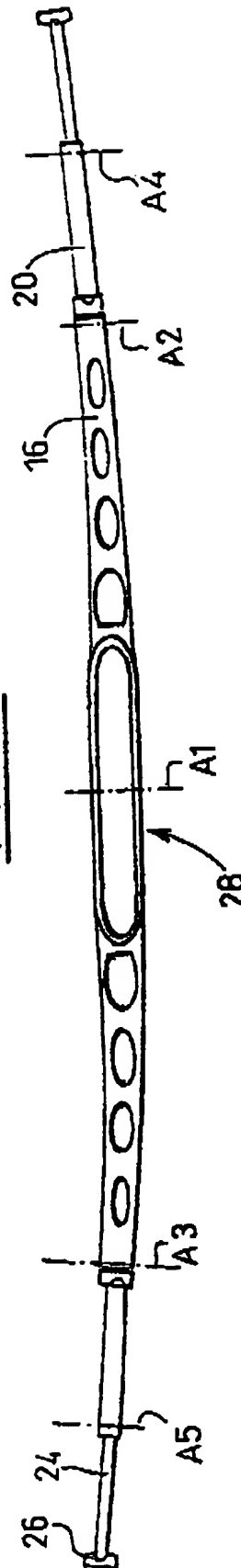


FIG.2



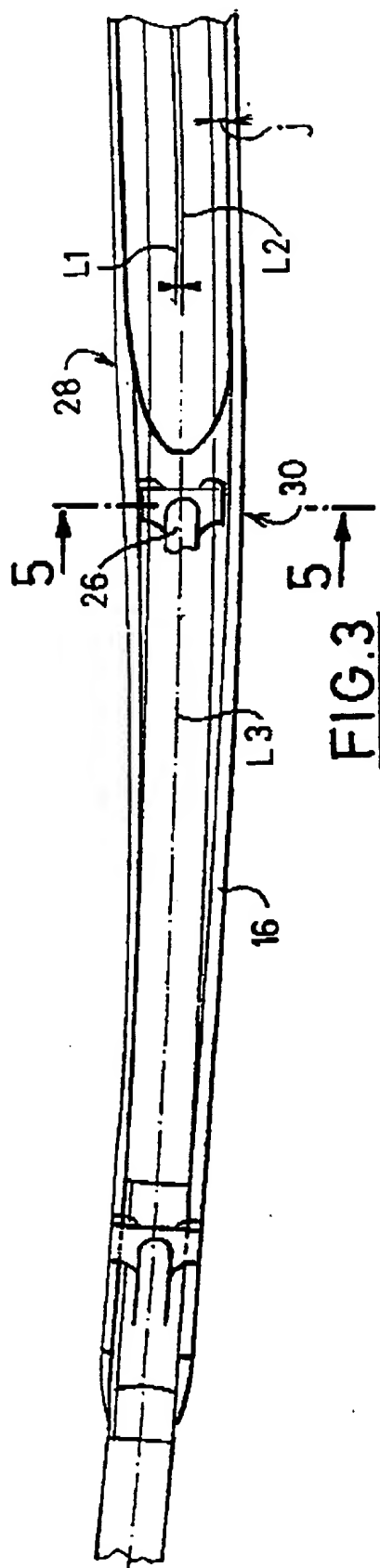


FIG. 3

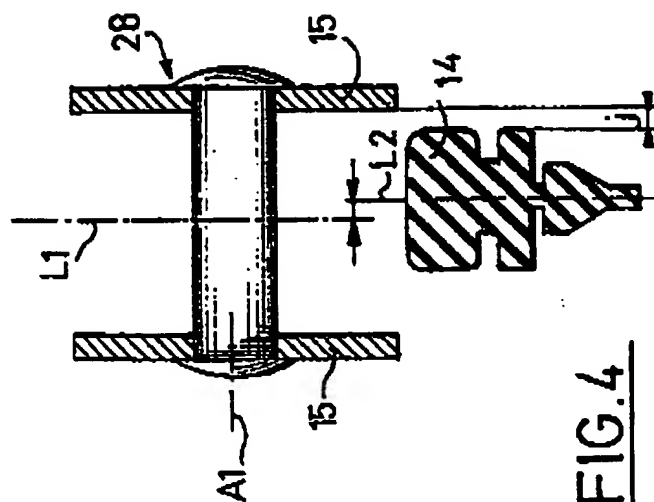


FIG. 4

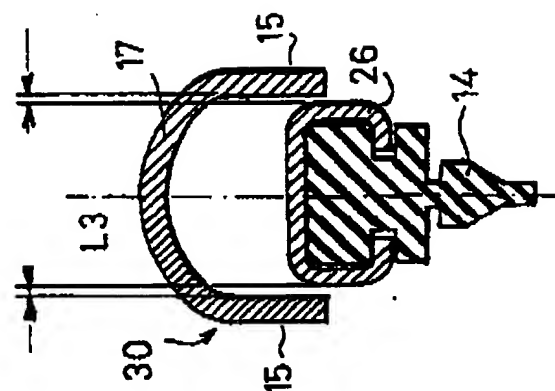


FIG. 5

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The invention concerns a curved windscreen wiper for a motor vehicle with a transversely offset blade.

10 The invention concerns more particularly a windscreen wiper for a motor vehicle of the type in which a flexible wiper blade is pressed against a window to be wiped by an articulated structure which has a main bracket which has a spreader articulated at at least one longitudinal end and which is deformable in a longitudinal plane substantially perpendicular to the overall plane of the window, of the type in which the main yoke, formed by two lateral wings joined together by an upper transverse
15 web, has in cross section the shape of an inverted U, of the type in which the articulated structure has, at each of its terminal ends, a hooking claw for the blade, of the type in which at least one of the claws of the spreader is arranged longitudinally opposite a section of the main yoke, and of the type in which the articulated structure is arranged so as to curve the blade in a longitudinal plane
20 substantially parallel to the overall plane of the window to be wiped.

A curved windscreen wiper has a wiper blade which extends in a curved line substantially in an arc of a circle and whose radius of curvature must be as uniform as possible all along the wiper.

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This constraint requires the claws of the articulated structure to have a precise position in space so as to give the blade this sought-for curved shape.

30 However, the articulated structure consists of elements generally produced from metal or a rigid plastic material, which are articulated on each other by substantially rectilinear portions so as not to prevent the relative pivoting of the elements on each other.

Thus the articulated structure of the curved wipers generally has a profile, seen from above, closer to a broken line than the ideal curve sought for the blade.

- 5 In a known manner, the yoke and the spreaders which form the articulated structure have in general terms a cross section in the shape of an inverted U, inside which the claws carrying the blade are able to be received when the articulated structure is deformed.
- 10 However, as the wiper blade and the articulated structure do not extend exactly according to the same profile, there can exist a transverse offset such that between the blade and the yoke of the articulated structure the claw is liable to interfere with one of the flanges of the yoke.
- 15 In order to avoid this, it may be necessary to increase the transverse width of the yoke or provide cut-outs in the lateral flanges, which impairs the appearance and strength of the wiper.

Thus, in the aim of providing a solution to this problem, the invention proposes.

- 20 Windscreen wiper for a windscreen wiper of a motor vehicle, wherein a flexible wiper blade is pressed against a window to be wiped by an articulated structure having a main yoke which has a spreader articulated at at least one longitudinal end and which is deformable in a longitudinal plane substantially perpendicular to the overall plane of the window, wherein the main yoke, formed by two lateral flanges
- 25 joined together by an upper transverse web, has in cross section the shape of an inverted U, wherein the articulated structure has, at each of its terminal ends, a hooking claw for the blade, wherein at least one claw of the spreader is arranged longitudinally opposite a section of the main yoke, wherein the articulated structure is arranged so as to curve the blade in a longitudinal plane substantially parallel to
- 30 the overall plane of the window to be wiped, and wherein the median longitudinal axis of the claw of the spreader which is opposite the yoke is substantially merged

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with the median longitudinal axis of the said section of the yoke so that the claw is able to be received between the two flanges of the section of the yoke when the articulated structure is deformed in its plane.

5 According to other characteristics of the invention:

- the claw is centred transversely with respect to the flanges of the said section of the main yoke;

- 10 - the articulated structure has at least one primary spreader articulated on the yoke and one secondary spreader articulated on the primary spreader, the secondary spreader has at least one hooking claw which is arranged longitudinally opposite a section of the main yoke or secondary spreader, and the median longitudinal axis of the said claw is substantially merged with the median longitudinal axis of the said
- 15 section so that the claw is able to be received between the two flanges of the said section when the articulated structure is deformed;

- the main yoke has a central portion by which it is articulated at the end of a windscreen wiper arm, and the blade is transversely offset with respect to the
- 20 median longitudinal axis of the central portion of the yoke;

- the central articulation portion of the main yoke and one of its longitudinal ends which carry a spreader are substantially rectilinear in a longitudinal plane substantially parallel to the overall plane of the window;

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- the central yoke has at least one section which is curved in a longitudinal plane substantially parallel to the overall plane of the window; and

- the main yoke is substantially symmetrical with respect to its median longitudinal
- 30 axis;

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Other characteristics and advantages of the invention will emerge from a reading of the detailed description which follows, for an understanding of which reference will be made to the accompanying drawings in which:

- 5 - Figures 1 and 2 are views, respectively from the side and from above, of a windscreen wiper in accordance with the disclosures of the invention;
- Figure 3 is a partial enlarged view of a detail of Figure 2;
- 10 - Figure 4 a view in cross section along the line 4-4 in Figure 1; and
- Figure 5 a view in cross section along the line 5-5 in Figure 3.

In the figures, like reference figures indicate like parts.

15

The figures show a windscreen wiper 10 for a motor vehicle which has an articulated structure 12 designed to press a wiper blade 14 against a window to be wiped of the vehicle, such as its windscreen.

- 20 The articulated structure 12 has a main yoke 16 which is mounted in rotation about a transverse axis A1 at the front longitudinal end of a windscreen wiper arm (not shown).

- 25 At each of the longitudinal ends 18 of the main yoke 16, a primary spreader 20 is mounted in rotation, by a substantially central portion, about a transverse axis A2, A3.

In the example embodiment depicted in the figures, each main yoke 20 carries, at a first end 22, a secondary spreader 24 which has two hooking claws 26 for the blade

30 14.

Each primary spreader 20 has, at its second opposite end, a hooking claw 26 for the blade 14 similar to the claws 26 of the secondary spreaders 24.

The secondary spreaders 24 are mounted so as to rotate about transverse axes A4,
5 A5 on the primary spreaders 22, 24.

In a known manner, the articulated structure 12 is thus deformable in a direction substantially perpendicular to the overall plane of the window to be wiped so that it pushes the blade 14 while imposing on it, through the hooking claws 26, a
10 substantially uniform contact pressure over its whole length.

As can be seen in Figure 2, the wiper 10 is of the type in which the blade 14 extends, not strictly in one plane, but in a direction curved in a plane substantially parallel to the plane of the window.

15

To this end, the whole of the articulated structure 12 is also curved so that the claws 26 of the primary spreaders 20 and secondary spreaders 24 impose the desired profile on the blade 14, which is produced from an elastic material.

20 However, the main yoke 16 and the primary spreader 20 and secondary spreader 24 are generally produced from a rigid material in the form of parts with a cross section with a profile of an inverted U. Thus, as can be seen notably in Figure 4, the main yoke 16 has two lateral longitudinal flanges 15 joined together by an upper transverse web 17.

25

At the articulation of the two parts, one of them is received inside the U-shaped profile of the other part and it is therefore necessary for their articulation portions to be substantially rectilinear in the longitudinal direction in order to avoid any jamming liable to block the rotation of the two parts and thereby block any deformation of the
30 articulated structure 12.

For example, the main yoke 16 has a central portion 28 for its rotational fitting in a known manner on the windscreen wiper and which is therefore rectilinear, and, in the same manner, each of its longitudinal ends 18 is also rectilinear.

- 5 However, the central portion 28 is connected to each of the ends 18 by curved sections.

Consequently, and as can be seen more especially in Figure 3, the median longitudinal axis L1 of the main yoke 16, which is an axis of symmetry of the yoke
10 16, is not a regular curve and is not merged with the median longitudinal axis L2 of the blade 14.

In the example embodiment depicted in the figures, it can be seen that each claw 26 which is carried by one of the ends of the primary spreaders 20 is arranged
15 vertically below a section 30 of the yoke 16 which is situated substantially between its central portion 28 for attaching to the arm and its longitudinal end 18 for articulation of the primary spreader 20.

Thus, as can be seen in Figure 4, when the articulated structure 12 is deformed so
20 that the blade 14 adopts the curvature of the window, the claw 26 is able to approach the section 30, or even appear above the lower edge 32 of the flanges 15 of the section 30.

Thus, in order to prevent the claw 26 making contact with one of the flanges 15,
25 provision is made, according to a first aspect of the invention, for the median longitudinal axis L3 of the claw 26, which is merged with the median longitudinal axis L2 of the blade 14, to be also substantially merged with the median longitudinal axis L1 of the yoke 16 level with the section 30.

30 This is because it is at the claws 26, whose transverse width is greater than that of the blade 14, that the risk of interference with the yoke 16 is greatest.

Preferably, it will be decided to centre the claw 26 transversely with respect to the section 30 of the yoke 16.

- 5 This choice of the position of the claw 36 leads, if the curvature of the blade 14 is to be regular, to the blade being, on the contrary, offset transversely with respect to the median axis L1 of the central yoke 16 in its central portion 28 for fitting onto the arm.

- 10 However, as can be seen in Figures 3 and 5, this does not represent a major handicap in that the central portion 28 of the yoke 16 is its widest portion by virtue of the fact that here an articulation connector (not shown) must be received between the two flanges of the yoke 16.

- 15 Furthermore, the central portion of the blade 14 generally has no hooking claws 26 so that there remains a sufficient clearance j between a lateral face of the blade 14 and a wing 15 of the yoke 16.

- 20 The invention can be applied to all claws 26 liable to interfere with the main yoke 16 or with a secondary spreader 20.

- It can, of course, also apply to windscreen wipers in which each primary spreader 20 has two intermediate spreaders 24 in order to therefore have eight hooking points available for the blade.

- 25 In general terms, the invention is to provide for the median longitudinal axes of the various constituent elements of the wiper to coincide in the areas in which they risk coming into contact.

CLAIMS

- 5 1. Windscreen wiper for a windscreen wiper of a motor vehicle, wherein a flexible wiper blade is pressed against a window to be wiped by an articulated structure having a main yoke which has a spreader articulated at at least one longitudinal end and which is deformable in a longitudinal plane substantially perpendicular to the overall plane of the window, wherein the main yoke, formed by two lateral flanges
10 joined together by an upper transverse web, has in cross section the shape of an inverted U, wherein the articulated structure has, at each of its terminal ends, a hooking claw for the blade, wherein at least one claw of the spreader is arranged longitudinally opposite a section of the main yoke, wherein the articulated structure is arranged so as to curve the blade in a longitudinal plane substantially parallel to
15 the overall plane of the window to be wiped, and wherein the median longitudinal axis of the claw of the spreader which is opposite the yoke is substantially merged with the median longitudinal axis of the said section of the yoke so that the claw is able to be received between the two flanges of the section of the yoke when the articulated structure is deformed in its plane.
- 20 2. A windscreen wiper according to Claim 1, wherein the claw is centred transversely with respect to the flanges of the said section of the main yoke.
- 25 3. A windscreen wiper according to Claim 1 or 2, wherein the articulated structure has at least one primary spreader articulated on the yoke and one secondary spreader articulated on the primary spreader, wherein the secondary spreader has at least one hooking claw which is arranged longitudinally opposite a portion of the main yoke or secondary spreader, and wherein the median longitudinal axis of the said claw is substantially merged with the median longitudinal axis of the said
30 portion so that the claw is able to be received between the two flanges of the said section when the articulated structure is deformed.

4. A windscreen wiper according to one of the preceding claims, wherein the main yoke has a central portion by which it is articulated at the end of a windscreen wiper arm, and the blade is transversely offset with respect to the median longitudinal axis
5 of the central portion of the yoke.

5. A windscreen wiper according to Claim 4, wherein the central articulation portion of the main yoke and one of its longitudinal ends which carry a spreader are substantially rectilinear in a longitudinal plane substantially parallel to the overall
10 plane of the window.

6. A windscreen wiper according to any one of the preceding claims, wherein the central yoke has at least one section which is curved in a longitudinal plane substantially parallel to the overall plane of the window.

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7. A windscreen wiper according to any one of the preceding claims, wherein the main yoke is substantially symmetrical with respect to its median longitudinal axis .

8. A windscreen wiper constructed and arranged substantially as herein before
20 described with reference to or as shown in the accompanying drawings.

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Application No: GB 9626338.9
Claims searched: 1 - 8.

Examiner: Justin Black
Date of search: 28 February 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A4F.

Int Cl (Ed.6): B60S (1/04, 1/32, 1/34, 1/38, 1/40, 1/42).

Other: Online: WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB2264433 A (CHINA WIPER). See page 4 line 13 - page 5 line 21, and figure 3.	
A	GB 2151914 A (SWF). See particularly page 2 lines 84- 91, page 3 lines 23 - 61, page 3 lines 104 - 117, and figure 3.	
A	GB 0878338 (GENERAL MOTORS). See particularly page 2 lines 78 - 86, page 2 lines 91 - 110, and figure 4.	
A	EP 0314033 A1 (SWF). See particularly figure 1.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Parent document published on or after, but with priority date earlier than, the filing date of this application.

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Windscreen wiper with curved cross-section

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Applicant(s): VALEO SYSTEMES ESSUYAGE (FR)
Requested Patent: ☐ GB2308542
Application Number: DE19961051230 19961210
Priority Number(s): FR19950015621 19951228
IPC Classification: B60S1/38
EC Classification: B60S1/38A
Equivalents: ☐ FR2743042

*Family***Abstract**

The wiper comprises a flexible blade (14) pressed by an articulated structure and has a main yoke with an articulated spreader situated at at least one longitudinal end. The blade is deformable in a longitudinal plane perpendicular to the overall plane of the window. The yoke is formed by two lateral flanges joined together by an upper transverse web. The yoke has an inverted U-shaped cross section. The articulated structure has hooking claws (26) for the blade. At least one claw is arranged longitudinally opposite a section of the yoke. The articulated structure is arranged to curve the blade in a longitudinal plane parallel to the overall plane of the window to be wiped. The median longitudinal axis (L3) of the claw opposite to the yoke is merged with the median axis of the section of the yoke so that the claw is able to be received between the two flanges (15) of the section of the yoke when the articulated structure is deformed in its plane.

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